

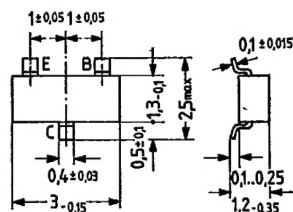
# NPN Silicon RF Broadband Transistor

BFT 75

SIEMENS AKTIENGESELLSCHAFT

BFT 75 is an epitaxial NPN silicon planar transistor in TO 236 plastic package (23 A 3 DIN 41869), intended for use in low-noise input and intermediate stages in RF amplifiers up to the GHz range, especially for high Q antenna and broadband amplifiers in film circuits. The transistor is marked "KA".

Type	Mark	Ordering code
BFT 75	KA	Q62702-F513



Approx. weight 0.02 g Dimensions in mm

## Maximum ratings

Collector-emitter voltage	$V_{CEO}$	15	V
Collector-emitter voltage ( $R_{BE} \leq 50 \Omega$ )	$V_{CER}$	20	V
Collector-base voltage	$V_{CBO}$	20	V
Base-emitter voltage	$V_{EBO}$	2.5	V
Collector current	$I_C$	50	mA
Base current	$I_B$	10	mA
Storage temperature range	$T_{stg}$	-55 to +125	°C
Junction temperature	$T_j$	150	°C
Total power dissipation ( $T_{amb} \leq 25^\circ\text{C}$ )	$P_{tot}$	250	mW

## Thermal resistance

Junction to ambient air	$R_{thJA}$	$\leq 500$	K/W
Junction to substrate back <sup>1)</sup>	$R_{thJSB}$	$\leq 400$	K/W

1) Ceramic substrate 0.7 mm; 2.5 cm<sup>2</sup> area

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Static characteristics ( $T_{amb} = 25^{\circ}\text{C}$ )

Collector cutoff current ( $V_{CB} = 10\text{ V}$ )	$I_{CBO}$	$\leq 50$	nA
( $V_{CB} = 10\text{ V}$ ; $T_{amb} = 60^{\circ}\text{C}$ )	$I_{CBO}$	$\leq 0.5$	$\mu\text{A}$
Collector cutoff current ( $V_{CE} = 20\text{ V}$ ; $V_{BE} = 0$ )	$I_{CES}$	$\leq 100$	$\mu\text{A}$
Emitter cutoff current ( $V_{EB} = 2\text{ V}$ )	$I_{EBO}$	$\leq 10$	$\mu\text{A}$
DC current gain			
( $I_C = 25\text{ mA}$ ; $V_{CE} = 8\text{ V}$ )	$h_{FE}$	$\geq 30$	—
( $I_C = 50\text{ mA}$ ; $V_{CE} = 5\text{ V}$ )	$h_{FE}$	$\geq 30$	—

Dynamic characteristics ( $T_{amb} = 25^{\circ}\text{C}$ )

Small signal current gain			
( $I_C = 25\text{ mA}$ ; $V_{CE} = 8\text{ V}$ ; $f = 1\text{ kHz}$ )	$h_{fe}$	80	—
Transition frequency			
( $I_C = 25\text{ mA}$ ; $V_{CE} = 8\text{ V}$ ; $f = 200\text{ MHz}$ )	$f_T$	5	GHz
( $I_C = 50\text{ mA}$ ; $V_{CE} = 5\text{ V}$ ; $f = 200\text{ MHz}$ )	$f_T$	4.5	GHz
Output capacitance			
( $V_{CB} = 8\text{ V}$ ; $I_E = 0$ )	$C_{ob}$	0.8	pF
Input capacitance			
( $V_{EB} = 0.5\text{ V}$ ; $I_E = 0$ )	$C_{ib}$	2.1	pF
Reverse transfer capacitance			
( $I_C = 1\text{ mA}$ ; $V_{CE} = 8\text{ V}$ )	$C_{12e}$	0.65	pF
Noise figure			
( $I_C = 1\text{ mA}$ ; $V_{CE} = 8\text{ V}$ ; $f = 800\text{ MHz}$ ; $R_g = 60\ \Omega$ )	NF	2.8	dB
( $I_C = 3\text{ mA}$ ; $V_{CE} = 8\text{ V}$ ; $f = 500\text{ MHz}$ ; $R_{gopt}$ )	$NF_{opt}$	1.9	dB
Power gain			
( $I_C = 25\text{ mA}$ ; $V_{CE} = 8\text{ V}$ ; $f = 800\text{ MHz}$ ; $R_g = 60\ \Omega$ )	$G_{pe}$	12	dB
Output voltage <sup>1)</sup>			
( $I_C = 25\text{ mA}$ ; $V_{CE} = 8\text{ V}$ ; $d_{IM} = 60\text{ dB}$ ; $R_L = R_g = 75\ \Omega$ )	$V_O$	350	mV

1) Three tone modulation  $f$  approx. 800 MHz

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**S parameter:**Operating point:  $V_{CE} = 5 \text{ V}$ ;  $I_C = 30 \text{ mA}$ ,  $Z_o = 50 \Omega$ 

$f$ (GHz)	$S_{11e}$	$\varphi$	$S_{21e}$	$\varphi$	$S_{12e}$	$\varphi$	$S_{22e}$	$\varphi$
0,1	0,316	-110	25,317	115	0,021	68	0,575	-38
0,2	0,260	-141	14,120	99	0,036	69	0,386	-32
0,3	0,262	-164	9,469	90	0,051	71	0,305	-37
0,4	0,246	-166	7,250	84	0,067	70	0,332	-31
0,5	0,241	176	5,848	80	0,082	70	0,278	-31
0,6	0,251	178	4,855	76	0,096	69	0,304	-37
0,7	0,227	167	4,253	72	0,112	68	0,314	-27
0,8	0,246	166	3,673	67	0,126	66	0,247	-31
0,9	0,217	159	3,346	64	0,143	64	0,278	-44
1,0	0,266	150	3,008	61	0,156	63	0,322	-37
1,1	0,241	155	2,782	57	0,171	62	0,254	-35
1,2	0,249	139	2,540	54	0,185	60	0,281	-49
1,3	0,262	139	2,365	50	0,199	57	0,291	-46
1,4	0,282	131	2,221	47	0,215	55	0,246	-50
1,5	0,277	134	2,120	44	0,229	54	0,312	-62
1,6	0,283	122	1,992	40	0,238	52	0,308	-49
1,7	0,327	121	1,863	38	0,251	51	0,181	-54
1,8	0,311	122	1,737	33	0,259	48	0,286	-92
1,9	0,312	114	1,719	30	0,281	45	0,361	-68
2,0	0,330	112	1,662	29	0,295	44	0,251	-56

Total perm. power dissipation  
versus temperature